



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Solar Heating and Lighting @ DOE *Energy 2006*

Glenn Strahs
*U.S. Department of Energy
Chicago, IL
August 8, 2006*



Solar Heating and Lighting

Status of Solar Heating & Lighting at U.S. Department of Energy
For FY07 budget, SH&L was originally zeroed out. But SH&L has been voted \$5M by both House of Representatives and Senate.

Solar Water Heating Activities:

- Developing solar water heaters using low-cost polymer materials that should cut costs in half, by two industry teams - Davis Energy Group/SunEarth & FAFCO for non-freezing climates
- Program planning solicitation for design/prototype of low-cost water heaters for freezing climates and maybe start space heating and cooling.
- Reestablished Technical Assistance capability at Sandia National Lab to help suppliers and users of solar thermal technologies at:
www.sandia.gov/Renewable_Energy/solarthermal/Center/index2.htm
- Supporting development of polymer materials for heat exchangers in the polymer solar water heating systems
- Supporting Testing and Certification of solar water collectors and systems with multi-year grant with Solar Rating & Certification Corp. (SRCC)
- Supporting NABCEP's Solar Thermal contractor testing and certification



U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Davis Energy Group/SunEarth Field Test





FAFCO Prototype





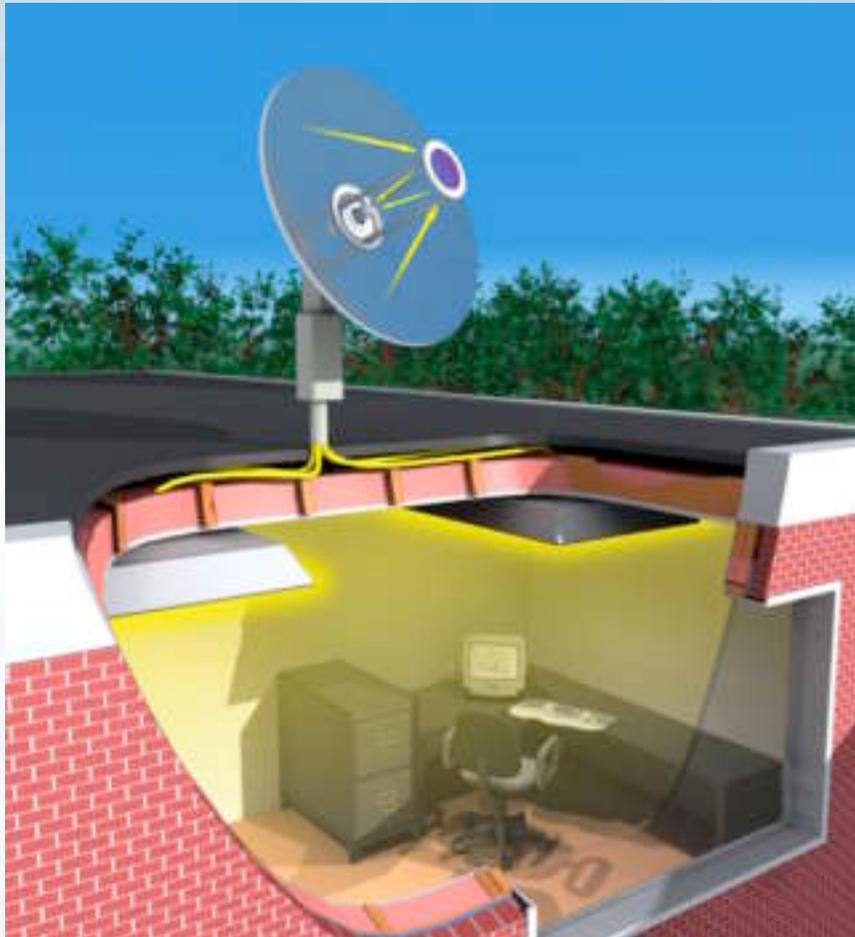
Solar Heating and Lighting

Hybrid Solar Lighting Activities

- DOE has been supporting development of HSL for several years and a few generations of the technology
- The use of natural sunlight, conveyed through the optical fibers of the HSL system, increase worker productivity, student performance and consumer purchasing
- HSL systems also avoid waste heat that other illumination systems emit to help the total energy picture
- The hybrid system controllers blend the natural light with artificial light, and save fossil energy when operating on solar
- Tracking devices keep system focused on sun throughout the day



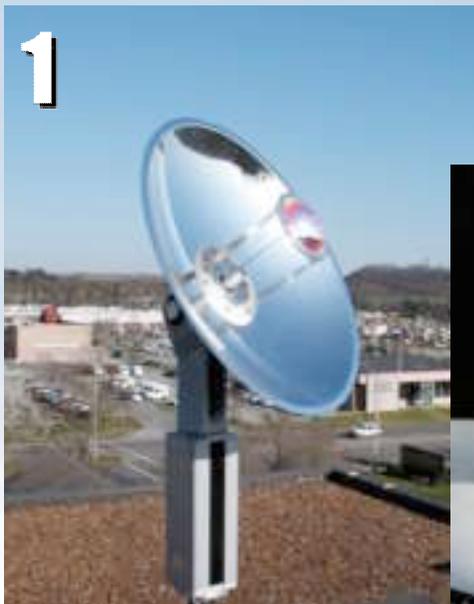
Solar Heating and Lighting



- Lighting accounts for a 1/4 of all electricity consumed for commercial use in the United States
- Most commercial lighting occurs during peak daylight hours
- HSL collects sunlight and distributes it, via plastic optical fibers, to “hybrid” luminaires which mix solar and electric light
- Photo-sensors adjust the electric lamps to compensate for changes in sunlight intensity



Solar Heating and Lighting



Solar Collector – Concentrates and collects the sunlight into an optical fiber bundle.



Plastic Fiber Optic Bundle – Transmits lighting into building interior.



Hybrid Luminaires – Disperse light into rooms.



ORNL Built on the Best Available Sun Tracking Technology



- Building on Sandia's research, ORNL developed an enhanced controller for HSL
- With the advancement of technology over the last 15 years ORNL was able to improve performance
- Improved precision due to faster calculation of equations
 - Variable-speed, solid-state motor control
 - Reduce 4 circuit boards into 1
 - GPS inputs for position and Coordinated Universal Time (UTC)
 - Windows user interface
 - Low cost and durability are objectives



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Current Beta Sites





Other DOE Solar Program Features



- _ Big Increase in PV research and technology acceptance from the Solar America Initiative for the next few years**
- _ Third Solar Decathlon in 2007 with 20 teams**
- _ New Concentrating Solar Power projects planned in Southwest**



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Thank You!

glenn.strahs@ee.doe.gov

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Solar Energy Technologies Program